



Scripps Institution of Oceanography, La Jolla, CA

[Home](#)[Introduction](#)[History & Legacy](#)[Research](#)[Data](#)[Graphics Gallery](#)[Photo Gallery](#)[Personnel](#)[Publications](#)[Presentations](#)[FAQ](#)[Links](#)[Contact Us](#)[Home](#) ▶ [Data](#) ▶ [Seawater CO₂](#)

SEAWATER CO₂

PRINT

pCO₂ Data

[Downwind 1957 Cruise](#)[Monsoon 1961 Cruise](#)[Lusiad 1962 Cruise](#)[Lusiad 1963 Cruise](#)

pCO₂ Data Discussion

During the late 1950's and early 1960's, Charles D. Keeling supervised the measurement of pCO₂ in surface ocean waters and in the atmosphere just above on a number of seagoing expeditions mounted by Scripps Institution of Oceanography. These expeditions ("cruises"), comprising long transects in the major oceans, were chosen to map the global features of surface ocean pCO₂. Data from most of these cruises are presented here for the first time in detail (in the form of hourly averages). The data had been processed soon after the cruises and presented in several research articles as averages, over geographical areas, of the difference in CO₂ concentration between ocean and atmosphere (see References). This site contains data from the DOWNWIND cruise in 1957, the MONSOON cruise in 1961, and the long LUSIAD cruise in 1962 and 1963.

[Read More>](#)

Status of Data and Correspondence:

These data are subject to revision after further review of calculation methods and calibration issues. Questions about the data should be directed to Dr. Ralph Keeling (rkeeling@ucsd.edu) and Mr. Peter Guenther (pguenther@ucsd.edu), Scripps CO₂ Program.

Accompanying Report:

L.S. Waterman, P.P. Tans, T. Aten, C.D. Keeling, and T.A. Boden, Quasi-simultaneous CO₂ Measurements in the Atmosphere and Surface Ocean Waters from Scripps Institution of Oceanography DOWNWIND, MONSOON, and LUSIAD Expeditions, 1957-1963, draft report, 38 pages, 1996. [\[Full Text\]](#)

References:

C.D. Keeling, N.W. Rakestraw, and L.S. Waterman, Carbon Dioxide in Surface Waters of the Pacific Ocean 1. Measurements of the Distribution, *Journal of Geophysical Research*, Vol. 70, p. 6087-6097 (1965).

C.D. Keeling, Carbon Dioxide in Surface Waters of the Pacific Ocean 2. Calculation of the Exchange with the Atmosphere, *Journal of Geophysical Research*, Vol. 70, p. 6099-6102 (1965).

C.D. Keeling and L.S. Waterman, Carbon Dioxide in Surface Ocean Waters 3. Measurements on Lusiad Expedition 1962-63, *Journal of Geophysical Research*, Vol. 73, p. 4529-4541 (1968).

C.D. Keeling, Carbon Dioxide in Surface Ocean Waters 4. Global Distribution, *Journal of Geophysical Research*, Vol. 73, p. 4543-4553 (1968).

L.S. Waterman, Carbon Dioxide in Surface Waters, *Nature*, 205, p. 1099-1100 (1965).



P.R. Guenther and C.D. Keeling, Manometer Report Report III: Manometric Calibrations of Primary CO₂ Reference Gases During 1974, prepared for the World Meteorological Organization, SIO Reference Series No. 81-19, 71 pages (1981).

D.W.T. Griffith, C.D. Keeling, J.A. Adams, P.R. Guenther, and R.B. Bacastow, Calculations of Carrier Gas Effects in non-dispersive infrared analyzers. II. Comparisons with Experiment, Tellus, 34, p. 385-397 (1982).

C.D. Keeling, P.R. Guenther, and D.J. Moss, Scripps Reference Gas Calibration System for Carbon Dioxide in Air Standards: Revision of 1985, Environmental Pollution, Monitoring and Research Programme Report Series No. 42 of the World Meteorological Organization (Technical Document WMO/TD-No. 125), 76 pages with Addendum (1986).